DECIBELMETER

REF. No. 10S/CA 863

R.H. MINNS BALUNS LTD.
LOWER MILL, KINGSTON ROAD,
EWELL, SURREY
KT17 2DY
TELEPHONE: 01-394 0499

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-10
0
dB
+10
-20
+20
-30
-40
-50
INPUT
600 Ω ∞
DECIBELS
5
0
DECIBELMETER ELECTRONIC
105/CA 863 SER. N° 30
R. H. MINNS ELECTRONICS
HORSHAM ENGLAND
SET ZERO
230 mA
230V AC
FUSE
OFF
250 mA
12V DC

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1 GENERAL DESCRIPTION AND PERFORMANCE SPECIFICATION

1.1 General Description

The 10S/CA 863 Decibelmeter is a fully transistorised indicator of line levels over the range + 25 to −55 dB relative to zero level (1mW into 600 ohms). The unit operates in the frequency range 30 c.p.s. to 12 Kc/s. The input impedance is nominally high (> 30K ohms) but an internal resistance of 600 ohms may be switched in to provide a termination.

The unit may be operated from any one of three power supplies as follows:−

1. 210 − 240V. a.c.
2. 12V. d.c. (internal battery).
3. 12 V. d.c. (external battery) − positive earth.

and is designed for rack mounting on a 19 inch panel having a width of 5¼ inches and a depth of 7½ inches from the front panel to the extremities of the fixed plugs mounted on the rear of the chassis. An easily removable metal cover is fitted from the rear. The weight of the unit is 15½ lbs. without internal power supplies.

The purpose of the instrument is to establish without ambiguity that apparatus attached to Post Office Private Wire Circuits is operating in conformity with Post Office Engineering Instructions.

The unit has the approval of the General Post Office authorities for applications of the type specified.

1.2 Performance Specification.

RANGE OF MEASUREMENT RELATIVE TO 1 mW INTO 600 OHMS	+ 25 dB to −55 dB.
FREQUENCY RANGE	30 c.p.s. to 12 Kc/s.
TERMINATION	> 30K ohms or 600 ohms.
FREQUENCY RESPONSE	± 0.25 dB over the full frequency range.
LEVEL MEASUREMENT ACCURACY	± 0.2 dB at 800 c.p.s.
NOMINAL SUPPLY VOLTAGE	210 − 240 V. a.c. or 12V. d.c.
POWER CONSUMPTION	1 W.
STABILITY AGAINST D.C. SUPPLY VARIATIONS	Maintains specified performance over a range of variation of d.c. supply voltage of ± 20% of nominal.
TEMPERATURE RANGE	Change of indicated level ± 0.1 dB per 10°C change of temperature in the range 0°C to + 45°C.

1.3 Description of Circuit.

The unit consists basically of the following:−

(a) Input transformer and attenuator.

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(b) Transistor amplifier and rectifier with stabiliser for collector supplies.

(c) A 0–1 mA edgewise meter having a scale length of 5 inches.

The input to the Decibelmeter is fed through a Post Office jack, J1, mounted on the front panel or a 2 pin Plessey plug, PL6, mounted on the rear of the chassis. A 600 ohm 1% resistor, R1, may be switched across the input terminals to provide termination by means of S2. The transformer has a 1:1 ratio and its secondary is terminated by a fixed potentiometer having a resistance of 35K ohms. This potentiometer consists of eight 1% tolerance high stability resistors whose values are arranged to provide seven steps of attenuation of 10 dB each. The steps are selected by means of a high quality wafer switch, S1.

The signal from S1 is fed to the base of TR1, which in combination with TR2 forms a super-alpha pair which presents an extremely high impedance to the attenuator. The output from TR2 is amplified by three identical stages of amplification in cascade, TR3, TR4 and TR5. Each of these stages has an un-decoupled emitter resistor, thereby providing a proportion of feedback in each stage. TR5 feeds a further stage of amplification TR6. In this case the emitter resistor R27 is decoupled by C9, and this emitter provides feedback at very low frequencies to the emitter of TR4 through R23. This circuit is used to inhibit any tendency to oscillation at frequencies of the order of 5 c.p.s. or less. A phase correction capacitor C8 is connected between emitter and base of TR6.

From TR6 the signal is fed to TR7, an emitter follower which in turn feeds the rectifier bridge MR2 – MR5. The low potential a.c. side of this bridge is taken to chassis through a resistive potentiometer consisting of R29, VR1 and R6. The a.c. voltage tapped off at the slider of VR1 provides a degree of overall feedback which is series connected into the input circuit through a further fixed potentiometer, R2 and R5, and the secondary of the input transformer. The series feedback connection increases still further the input impedance of the super-alpha pair. The amount of feedback applied in this way may be varied by VR1 which therefore is used as the "SET ZERO" control and is brought out as a pre-set control to the front panel.

The overall feedback of the whole amplifier is 28 dB. The collector supply is stabilised against voltage changes to approximately 8.5V by the zener diode MR1 which holds the base of the OC 72 at the zener voltage. Should the collector supply line voltage tend to vary, a change in the emitter/base voltage results. This produces a change in the effective resistance of the transistor, which is in series with the collector supply, of such a nature as to oppose the original variation.

The whole of the amplifier circuitry is on a plug-in printed board mounted underneath the chassis.

The d.c. output from the rectifier is fed through an edgewise type meter having a 1 mA movement. The meter indicates 'O' dB at its centre point and is calibrated in 0.5 dB divisions to '–5' and '+5' dB.

The unit may be powered by either one of three supplies viz. 240 V a.c., 12 V d.c. external or 12 V d.c. internal. The mains unit (type 10S/CA. 979) or battery unit (type BPS 12) may be fitted into the space immediately behind the fuses. Both units have a 10 way plug which when fitted into the corresponding 10 way socket mounted on the side of the chassis, provides the necessary connections between power unit and Decibelmeter Circuitry.

The external 12 V d.c. supply is brought in through a four pin Plessey plug, PL5, on the rear of the chassis.

N.B. THIS SUPPLY MUST HAVE A POSITIVE EARTH.

The mains input is brought through three pin Plessey plug, PL4, on the rear of the chassis.

Selection of the a.c. or d.c. supply is made on the three position ON/OFF switch on the front panel.

Selection between internal or external 12 V d.c. supply is made by a toggle switch S5, mounted on the rear of the chassis.

The mains supply is protected by a 250 mA anti-surge fuse connected between the live terminal of the mains input socket and the ON/OFF switch.

The d.c. supplies are protected by a 250 mA anti-surge fuse connected in the positive line. This fuse is in circuit for ALL conditions of supply.

A low consumption pilot lamp (0.75W) is fitted on the front panel. This lamp is connected across the 12 V d.c. supply to the decibelmeter circuits and consequently lights in all conditions of power supply.

2 OPERATING INSTRUCTIONS

2.1 Connect 12 v d.c. external supply to 4 pin plug, PL5 or 240 V a.c. supply to 3 pin plug, PL4, on rear of chassis as required.

N.B. THE D.C. SUPPLY MUST HAVE A POSITIVE EARTH

2.2 If an external d.c. supply is not to be used check that either Mains Unit Type 10 S/CA. 979 or Battery Unit Type BPS 12 is in position.

2.3 Switch toggle, S5, on rear of chassis to "INT BATT" or "EXT BATT" as required. (Note. The position of this switch is immaterial if 240 V a.c. supply is to be used).

2.4 Switch the "ON/OFF" switch on the front panel to "230 V a.c." or "12 v d.c." as required and note that pilot lamp lights.

2.5 Set the input attenuator to the '+ 20' dB position.

2.6 Connect the signal to be measured into the front panel jack, J1, or the rear input plug, PL6 as required. Set the input impedance of the Decibelmeter to "600 ohms" or "through" as required.

2.7 Adjust the attenuator until the meter reads on the scale. The input signal level is then indicated by the combined readings of the attenuator and the meter.

3 CALIBRATION

3.1 Test Equipment.

For a full line-up of the decibelmeter the following test equipment will be required:–

3.1.1 A high quality VARIABLE FREQUENCY AUDIO SOURCE with the following minimum performance figures:–

(a) Frequency range:– 30 c/s to 12 Kc/s.

(b) Output:– + 20 dBm to – 55 dBm – 600 ohms balanced.

(c) Distortion:– ∄ 1% at any frequency.

3.1.2 A Standard ZERO LEVEL GENERATOR or ZERO LEVEL MEASURING DEVICE having an accuracy of ± 0.1 dBm.

3.1.3 A DECIBELMETER having the following minimum performance figures:–

(a) Sensitivity:– + 25 dBm to – 55 dBm.

(b) Frequency Characteristics:– ± 0.1 dB from 30 c/s to 12 Kc/s.

(c) Input:– ∢ 30 K ohms – balanced.

NOTE:– This instrument is referred to in text as the REF DECIBELMETER in order to differentiate between it and the instrument on test.

3.1.4 An external floating D.C. SUPPLY capable of being set to 9.6, 12 and 14.4 V d.c. and supplying a current of 100 mA.

3.1.5 A load resistor of 600 ohms, 1%.

3.2 Calibration Procedure

3.2.1 Input impedance.

(i) Equipment Required:–

(a) AUDIO FREQUENCY OSCILLATOR (see page 4 Section 3.1.1).

(b) STANDARD ZERO LEVEL GENERATOR (see page 5 Section 3.1.2).

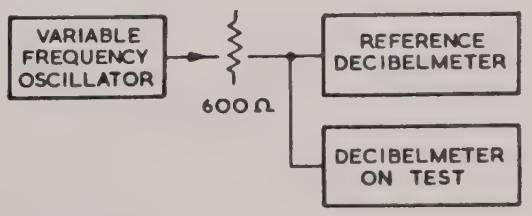
(c) REFERENCE DECIBELMETER (see page 5 Section 3.1.3).

(d) Load resistor, 600 ohms 1%.

(ii) Set the mechanical zero of the Decibelmeter on test with the unit switched off. Set the input impedance to be "∞" by means of the front panel switch and the attenuator to the '0' dB position.

(iii) Use the standard ZERO LEVEL GENERATOR or ZERO LEVEL MEASURING DEVICE to set the REF DECIBELMETER to read zero level at 0.8 Kc/s with the 600 ohm load across its input.

(iv) Set up apparatus as below:–



(v) Set the AUDIO OSCILLATOR to 0.8 Kc/s and adjust the input to the REF DECIBELMETER to zero level. Adjust "SET ZERO" control on Decibelmeter under test to give a meter reading of '0' dB.

(vi) Switch the front panel switch to 600 ohms and remove the external 600 ohm load. The level indicated by the REF DECIBELMETER should be within ±0.2 dB of zero level.

(vii) Set both Decibelmeters to "+ 20 dBm" and "VAR OSC" to 12Kc/s. Adjust input to "REF DECIBELMETER" to be + 20 dBm. Remove the input to Decibelmeter under test. The "REF DECIBELMETER" reading should rise by ± 0.1 dB. Repeat measurement at 30 c.p.s.

(viii) Repeat (vii) above at – 50 dBm.

3.2.2 Frequency Response

(i) Equipment Required:–

(a) AUDIO FREQUENCY OSCILLATOR (see page 4 Section 3.1.1).

(b) REFERENCE DECIBELMETER (see page 5 Section 3.1.3).

(c) Load resistor, 600 ohms 1%.

(ii) Set up apparatus as in 3.2.1 (iv) above.

(iii) Set Decibelmeter under test to the "00" impedance condition and both decibelmeters to read zero level with an input frequency of 0.8 Kc/s.

(iv) Set the AUDIO OSCILLATOR to the following frequencies in succession:–

30 c/s; 80 c/s; 3 Kc/s; 8 Kc/s; 10 Kc/s; 12 Kc/s.

At each frequency adjust the input level to the REF DECIBELMETER to be 0 dBm. The reading on the Decibelmeter under test should not differ from that at 0.8 Kc/s by more than 0.2 dB at any point.

(v) Repeat 3.2.2 (iv) at input levels of + 20 dBm and – 50 dBm.

3.2.3 Input Level Check

(i) Equipment Required:–

(a) AUDIO FREQUENCY OSCILLATOR (see page 4 Section 3.1.1)

(b) REFERENCE DECIBELMETER (see page 5 Section 3.1.3)

(c) Load resistor, 600 ohms 1%.

(ii) Set up apparatus as in 3.2.1 (iv) above, and adjust input to both Decibelmeters to be zero level at 0.8 Kc/s.

(iii) Vary the input level to both decibelmeters in 1 dB steps as measured on the REF DECIBELMETER to a maximum of + 5 dB and a minimum of – 5 dB. The reading on the Decibelmeter under test should not vary from that indicated by more than 0.2 dB at any point.

(iv) Set the input levels to both decibelmeters successively to the following as measured on the REF DECIBELMETER:–

+ 20 dB; + 10 dB; – 10 dB; – 20 dB; – 30 dB; – 40 dB; – 50 dB.

The reading on the unit under test should not vary from that indicated by more than 0.2 dB.

3.2.4 Stability against D.C. Supply Variations.

(i) Equipment Required:–

(a) AUDIO FREQUENCY OSCILLATOR (see page 4 Section 3.1.1)

(b) REFERENCE DECIBELMETER (see page 5 Section 3.1.3)

(c) Load resistor, 600 ohms 1%.

(d) 9 – 15V d.c. Power Supply (see page 5 Section 3.1.4)

(ii) Set up apparatus as in 3.2.1 (iv) above, and adjust the supply volts to the Decibelmeter under test to 12v d.c.

(iii) Set input level to both decibelmeters to – 50 dBm at 0.8 Kc/s. Vary the supply volts to Decibelmeter under test from 9.6 to 14.4 volts and check that the reading does not vary by more than 0.1 dB.

4 MAINTENANCE

N.B. SWITCH OFF BEFORE REMOVING PRINTED BOARDS

4.1 Printed Boards.

4.1.1 To remove the amplifier board first remove holding screws and lift board out carefully using the lugs provided on the plug mountings.

N.B. NEVER PULL THE BOARD UP BY THE COMPONENTS

Heat shunts MUST be used when soldering transistor leads.

It is often advantageous to cut the leads of a faulty component close to the component before removing it from the board, and solder the new component on to the old leads.

Having replaced the board, always fasten it down with the holding screws.

4.2 Routine Checks.

4.2.1 Four weekly maintenance.

The instrument should be inspected and dirt and dust removed, preferably by means of a vacuum cleaner.
Where switches have not been in regular use they may be operated a few times in order to clean the contacts. Proprietory brands of contact cleaning fluid should only be used when absolutely necessary.

N.B. NEVER CLEAN CONTACTS WITH CARBON TETRACHLORIDE

Check that all knobs are tight and that fuses are of the correct type.

4.2.2 Six monthly maintenance.

Voltage readings should be checked. (It may be advantageous to keep a record of these for each particular instrument). Approximate level and frequency response checks should be carried out. Where the specified test gear is not available it is useful to cross check two 10S/CA 863 Decibelmeters or check the 10S/CA 863 Decibelmeter against a 10S/CA 862 Oscillator.

4.3 Component Replacement, etc.

High stability and high tolerance components should only be replaced by comparable items (e.g. attenuator resistors).

The transformer T1 should not be replaced by any other type or the performance of the instrument will be seriously affected.

The pilot lamp should only be replaced by a similar type as excessive drain on the battery will result if a higher consumption type is used.

4.4 Table of D.C. Voltages

Notes:– All voltages measured are negative with respect to earth, using an Avometer Model 8. The Decibelmeter must be set to measure zero level and to have no signal input. Voltages quoted were obtained from twelve units selected at random.

TEST POINT		VOLTAGE LIMITS		AVOMETER MODEL 8 RANGE
		HIGH	LOW	
TR8	BASE / C4	8.9	7.8	10 V. D.C.
	COLLECTOR / PL1 PIN 2	12.00	–	25 V. D.C.
	EMITTER / R18	8.7	8.1	10 V. D.C.
C5		6.4	5.5	10 V. D.C.
TR1	BASE / PL1 PIN 5	0.6	0.4	2.5 V. D.C.
	COLLECTOR / TR2 (c)	4.9	4.0	10 V. D.C.
	EMITTER / TR2 (b)	0.5	0.25	2.5 V. D.C.
TR2	EMITTER / R8	0.5	0.25	2.5 V. D.C.
TR3	BASE / R9, R10	0.52	0.35	2.5 V. D.C.
	COLLECTOR / R11	4.3	3.1	10 V. D.C.
	EMITTER / R12	0.45	0.25	2.5 V. D.C.
TR4	BASE / R13, R14	0.5	0.4	2.5 V. D.C.
	COLLECTOR / R16	4.5	3.5	10 V. D.C.
	EMITTER / R17	0.4	0.25	2.5 V. D.C.
TR5	BASE / R19, R20	0.75	0.5	2.5 V. D.C.
	COLLECTOR / R21	5.6	3.8	10 V. D.C.
	EMITTER / R22	0.55	0.35	2.5 V. D.C.
TR6	BASE / R24, R25	0.65	0.5	2.5 V. D.C.
	COLLECTOR / R26	5.3	4.0	10 V. D.C.
	EMITTER / R27	0.55	0.4	2.5 V. D.C.
TR7	EMITTER / R28	5.0	3.8	10 V. D.C.

CIRCUIT COMPONENTS LIST FOR DECIBELMETER ELECTRONIC 10S/CA 863 INPUT STAGE

CIRCUIT REF.	DESCRIPTION	VALUE	TOL %	RATING
J1	JACK SOCKET, 4112C			
PL6	PLUG, FIXED, 2 WAY, MK. 4 SIZE 1			
R1	RESISTOR, CARBON FILM, H.S.	607R	± 1	0.25W
R2	RESISTOR, CARBON FILM, H.S.	24K	± 1	0.25W
R3	RESISTOR, CARBON FILM, H.S.	7K5	± 1	0.25W
R4	RESISTOR, CARBON FILM, H.S.	2K4	± 1	0.25W
R5	RESISTOR, CARBON FILM, H.S.	750R	± 1	0.25W
R6	RESISTOR, CARBON FILM, H.S.	240R	± 1	0.25W
R7	RESISTOR, CARBON FILM, H.S.	75R	± 1	0.25W
R8	RESISTOR, CARBON FILM, H.S.	24R	± 1	0.25W
R9	RESISTOR, CARBON FILM, H.S.	11R A.O.T.	± 1	0.25W
R10	RESISTOR, METAL FILM	47K A.O.T.	± 2	0.4W
S1	SWITCH, 1 POLE, 8 WAY, M.B.B.			
S2	SWITCH, 1 POLE, 2 WAY			
T1	TRANSFORMER, INPUT (R.H. Minns Baluns Ltd.)			

CIRCUIT COMPONENTS LIST FOR DECIBELMETER ELECTRONIC 10S/CA 863 AMPLIFIER-DETECTOR

CIRCUIT REF.	DESCRIPTION	VALUE	TOL %	RATING
C1	CAPACITOR, ELECTROLYTIC	10μF	+ 50 – 10	16V. D.C.
C2	CAPACITOR, ELECTROLYTIC	47μF	+ 50 – 10	16V. D.C.
C3	CAPACITOR, ELECTROLYTIC	10μF	+ 50 – 10	16V. D.C.
C4	CAPACITOR, ELECTROLYTIC	47μF.	+ 50 – 10	16V. D.C.
C5	CAPACITOR, ELECTROLYTIC	470μF	+ 50 – 10	10V. D.C.
C6	CAPACITOR, ELECTROLYTIC	10μF	+ 50 – 10	16V. D.C.
C7	CAPACITOR, ELECTROLYTIC	33μF	+ 50 – 10	16V. D.C.
C8	CAPACITOR, SILVERED MICA	150pF A.O.T.	± 1	350V. D.C.
C9	CAPACITOR, ELECTROLYTIC	220μF	+ 50 – 10	10V. D.C.
C10	CAPACITOR, ELECTROLYTIC	33μF.	+ 50 – 10	16V. D.C.
M1	METER, SCALED –5 to +5 db			1 mA F.S.D.
MR1	DIODE, ZENER, BZY88/C8V2			8.2V. 400mW.
MR2	DIODE, OA91			17mA. max.
MR3	DIODE, OA91			17mA. max.
MR4	DIODE, OA91			17mA. max.
MR5	DIODE, OA91			17mA. max.
PL1	PLUG, 8 WAY, PP8			
PL2	PLUG, 6 WAY, PP6			
R2	RESISTOR, METAL FILM	1K2	± 2	0.4W
R3	RESISTOR, METAL FILM	47K	± 2	0.4W
R4	RESISTOR, METAL FILM	4K7	± 2	0.4W
R5	RESISTOR, METAL FILM	12R	± 2	0.4W
R6	RESISTOR, METAL FILM	470R	± 2	0.4W
R7	RESISTOR, METAL FILM	2K2	± 2	0.4W
R8	RESISTOR, METAL FILM	470R	± 2	0.4W

CIRCUIT COMPONENTS LIST FOR DECIBELMETER ELECTRONIC 10S/CA 863 AMPLIFIER-DETECTOR.

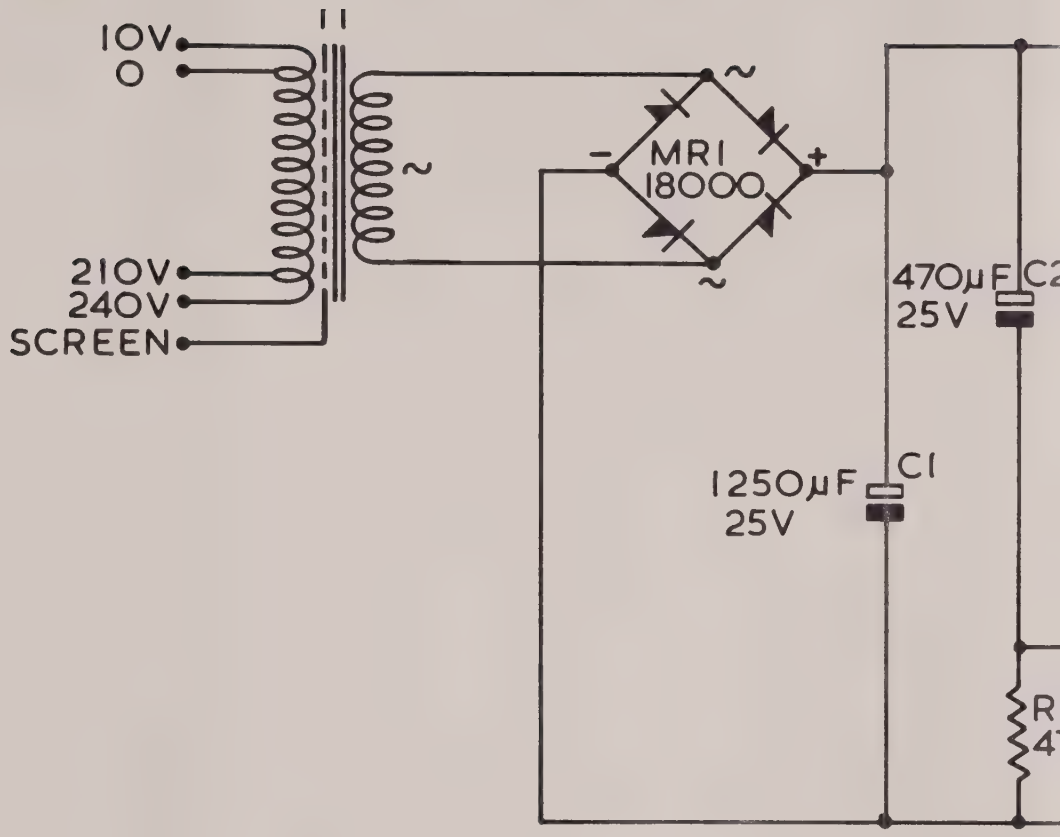
CIRCUIT REF.	DESCRIPTION	VALUE	TOL %	RATING
R9	RESISTOR, METAL FILM	56K	± 2	0.4W
R10	RESISTOR, METAL FILM	5K6	± 2	0.4W
R11	RESISTOR, METAL FILM	3K3	± 2	0.4W
R12	RESISTOR, METAL FILM	470R	± 2	0.4W
R13	RESISTOR, METAL FILM	56K	± 2	0.4W
R14	RESISTOR, METAL FILM	5K6	± 2	0.4W
R15	RESISTOR, METAL FILM	270R	± 2	0.4W
R16	RESISTOR, METAL FILM	3K3	± 2	0.4W
R17	RESISTOR, METAL FILM	470R	± 2	0.4W
R18	RESISTOR, METAL FILM	1K	± 2	0.4W
R19	RESISTOR, METAL FILM	56K	± 2	0.4W
R20	RESISTOR, METAL FILM	5K6	± 2	0.4W
R21	RESISTOR, METAL FILM	3K3	± 2	0.4W
R22	RESISTOR, METAL FILM	470R	± 2	0.4W
R23	RESISTOR, METAL FILM	1K	± 2	0.4W
R24	RESISTOR, METAL FILM	56K	± 2	0.4W
R25	RESISTOR, METAL FILM	5K6	± 2	0.4W
R26	RESISTOR, METAL FILM	3K3	± 2	0.4W
R27	RESISTOR, METAL FILM	470R	± 2	0.4W
R28	RESISTOR, METAL FILM	1K	± 2	0.4W
R29	RESISTOR, METAL FILM	820R	± 2	0.4W
SK1	SOCKET, 8 WAY, PS8			
SK2	SOCKET, 6 WAY, PS6			
TR1	TRANSISTOR, ASY 26			
TR2	TRANSISTOR, ASY 26			
TR3	TRANSISTOR, ASY 26			
TR4	TRANSISTOR, ASY 26			
TR5	TRANSISTOR, ASY 26			
TR6	TRANSISTOR, ASY 26			
TR7	TRANSISTOR, ACY 20			
TR8	TRANSISTOR, ACY 20			
VR1	RESISTOR, VARIABLE	250R		1.0W.

CIRCUIT COMPONENTS LIST FOR DECIBELMETER ELECTRONIC 10S/CA 863 SUPPLIES SWITCHING.

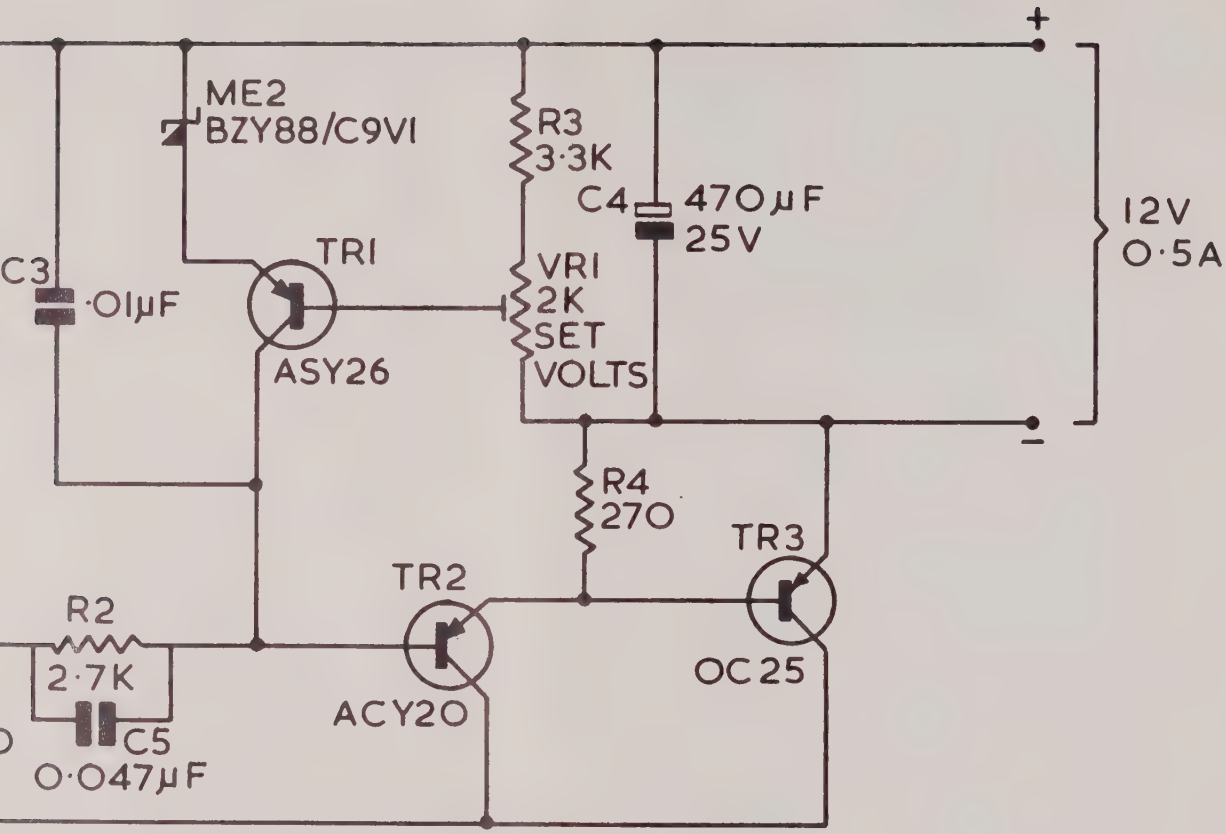
CIRCUIT REF.	DESCRIPTION	VALUE	TOL %	RATING
F1	FUSE, LENGTH 1¼" DIA ¼" A/S			250mA.
	FUSEHOLDER, L.1438			
F2	FUSE, LENGTH 1¼" DIA ¼" A/S			250mA.
	FUSEHOLDER, L. 1438			
LP1	LAMP, PILOT, L.E.S.			14V. 0.75W.
	LAMPHOLDER, RED			
*PL3	PLUG, 10 WAY			
PL4	PLUG, FIXED, 3 WAY, MK.4 SIZE 1			
PL5	PLUG, FIXED, 4 WAY, MK.4 SIZE 1			
S4	SWITCH, 4 POLE, 3 WAY, M.B.B.			
S5	SWITCH, D.P.D.T.			
SK3	SOCKET, 10 WAY			
*PART OF POWER UNIT 10S/CA 979 OR BPS 12				

CIRCUIT COMPONENTS LIST FOR POWER SUPPLY 10S/CA 979

CIRCUIT REF.	DESCRIPTION	VALUE	TOL %	RATING
C1	CAPACITOR, ELECTROLYTIC	1250μF	+ 50 − 10	25V. D.C.
C2	CAPACITOR, ELECTROLYTIC	470μF	+100 − 20	25V. D.C.
C3	CAPACITOR, POLYESTER	0.01μF	± 20	250V. D.C.
C4	CAPACITOR, ELECTROLYTIC	470μF	+ 100 - 20	25V. D.C.
C5	CAPACITOR, POLYESTER	0.047μF	± 20	250V. D.C.
R1	RESISTOR, METAL FILM	470R	± 2	0.4W
R2	RESISTOR, METAL FILM	2K7	± 2	0.4W
R3	RESISTOR, METAL FILM	3K3	± 2	0.4W
R4	RESISTOR, METAL FILM	270R	± 2	0.4W
VR1	RESISTOR, VARIABLE	2K2	± 20	0.2W
TR1	TRANSISTOR ASY26			
TR2	TRANSISTOR ACY20			
TR3	TRANSISTOR OC25			
MR1	RECTIFIER, BRIDGE, USD 13099			50V. 1.0A
MR2	DIODE, ZENER, BZY88/C9V1			
T1	TRANSFORMER, MAINS 240/14V			



D.C. RESISTANCE –	< 0·25Ω AT 240V INPUT
A.C. IMPEDANCE –	< 0·25Ω 500 Hz – 15 kHz
NOISE & HUM –	< 5·0M.V. R.M.S.
REGULATION –	> 30 : 1



CIRCUIT DIAGRAM
TRANSISTOR POWER SUPPLY
TYPE T.P.S. 12/·5

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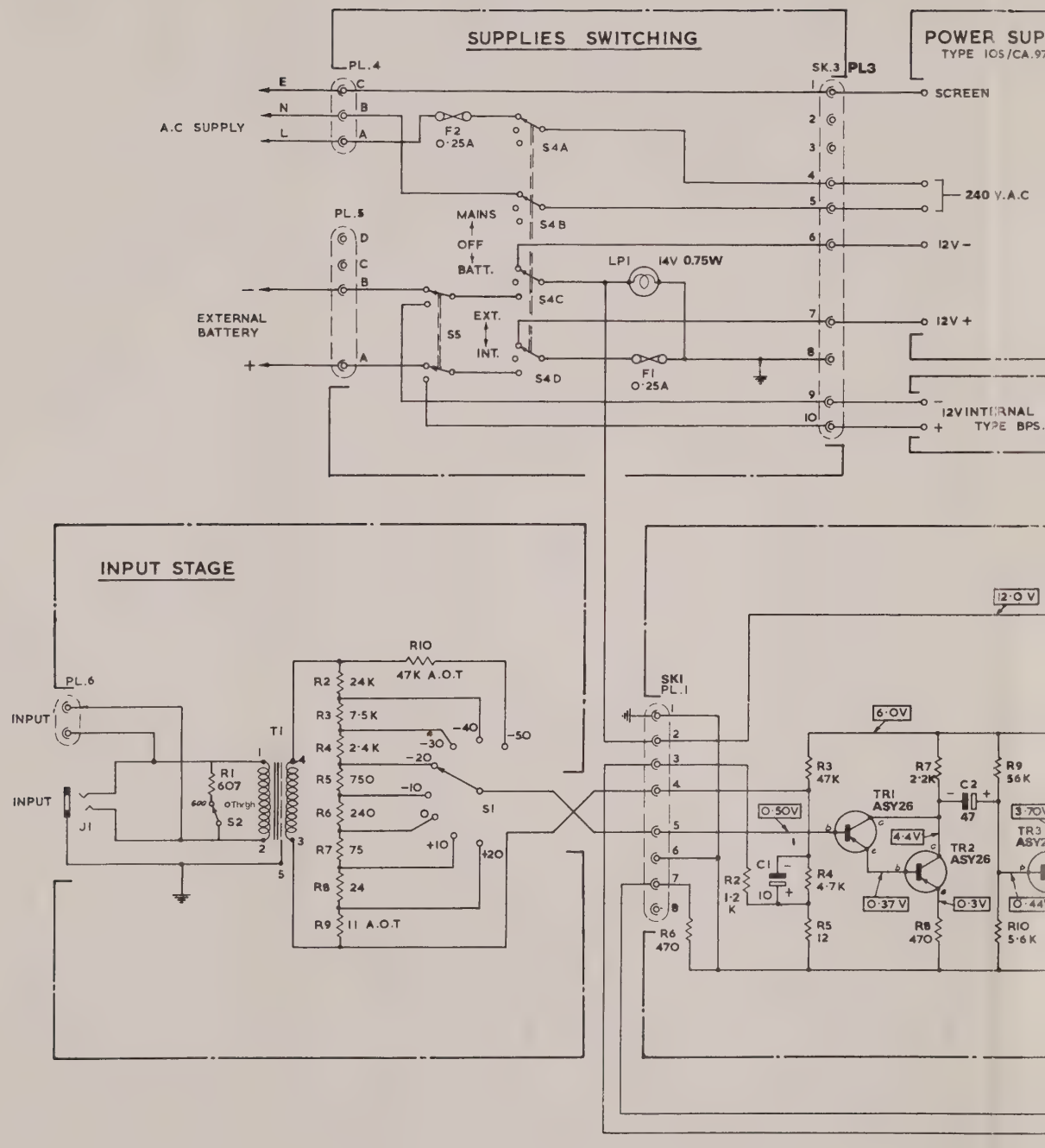
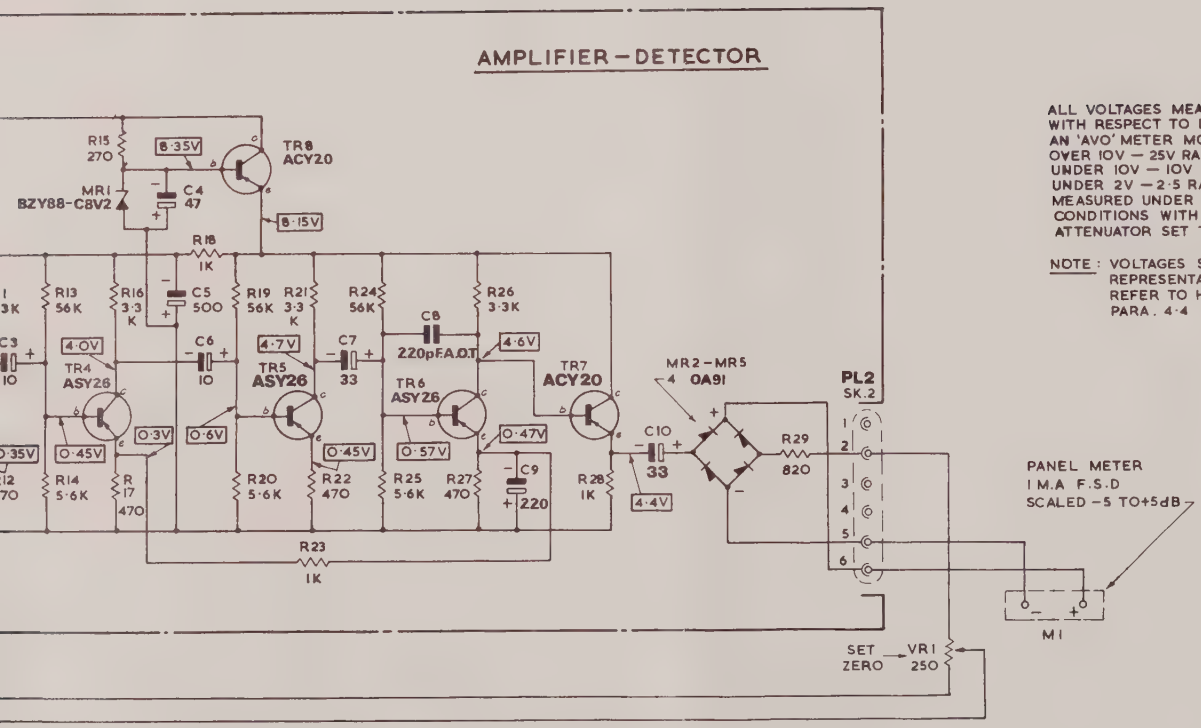

SUPPLIES SWITCHING
POWER SUP
TYPE 105/CA.97
PL.4
SK.3 PL3
E
N
L
A.C SUPPLY
C
B
A
F2
0·25A
S4A
S4B
SCREEN
240 V.A.C
12V –
12V +
PL.5
D
C
B
A
MAINS
OFF
BATT.
S4C
LP1 14V 0.75W
EXTERNAL
BATTERY
EXT.
S5
INT.
S4D
F1
0·25A
12V INTERNAL
TYPE BPS
INPUT STAGE
12·0 V
RIO
47K A.O.T
PL.6
INPUT
INPUT
T1
R1
607
600 Thrgh
S2
J1
R2 24K
R3 7·5K
R4 2·4K
R5 750
R6 240
R7 75
R8 24
R9 11 A.O.T
–40
–30
–20
–10
+10
+20
–50
S1
SK1
PL.1
6·0V
0·50V
C1
10
R2
1·2
K
R3
47K
R4
4·7K
R5
12
R6
470
TR1
ASY26
TR2
ASY26
4·4V
0·37 V
0·3V
R7
2·2K
C2
47
R8
470
R9
56K
RIO
5·6K



ALL VOLTAGES MEASURED ARE WITH RESPECT TO EARTH USING AN 'AVO' METER MODEL 8
OVER 10V – 25V RANGE
UNDER 10V – 10V RANGE
UNDER 2V – 2·5 RANGE
MEASURED UNDER NO SIGNAL CONDITIONS WITH INPUT ATTENUATOR SET TO ZERO.

NOTE: VOLTAGES SHOWN ARE REPRESENTATIVE ONLY REFER TO HANDBOOK PARA. 4·4

DECIBELMETER
ELECTRONIC
IOS/CA 863

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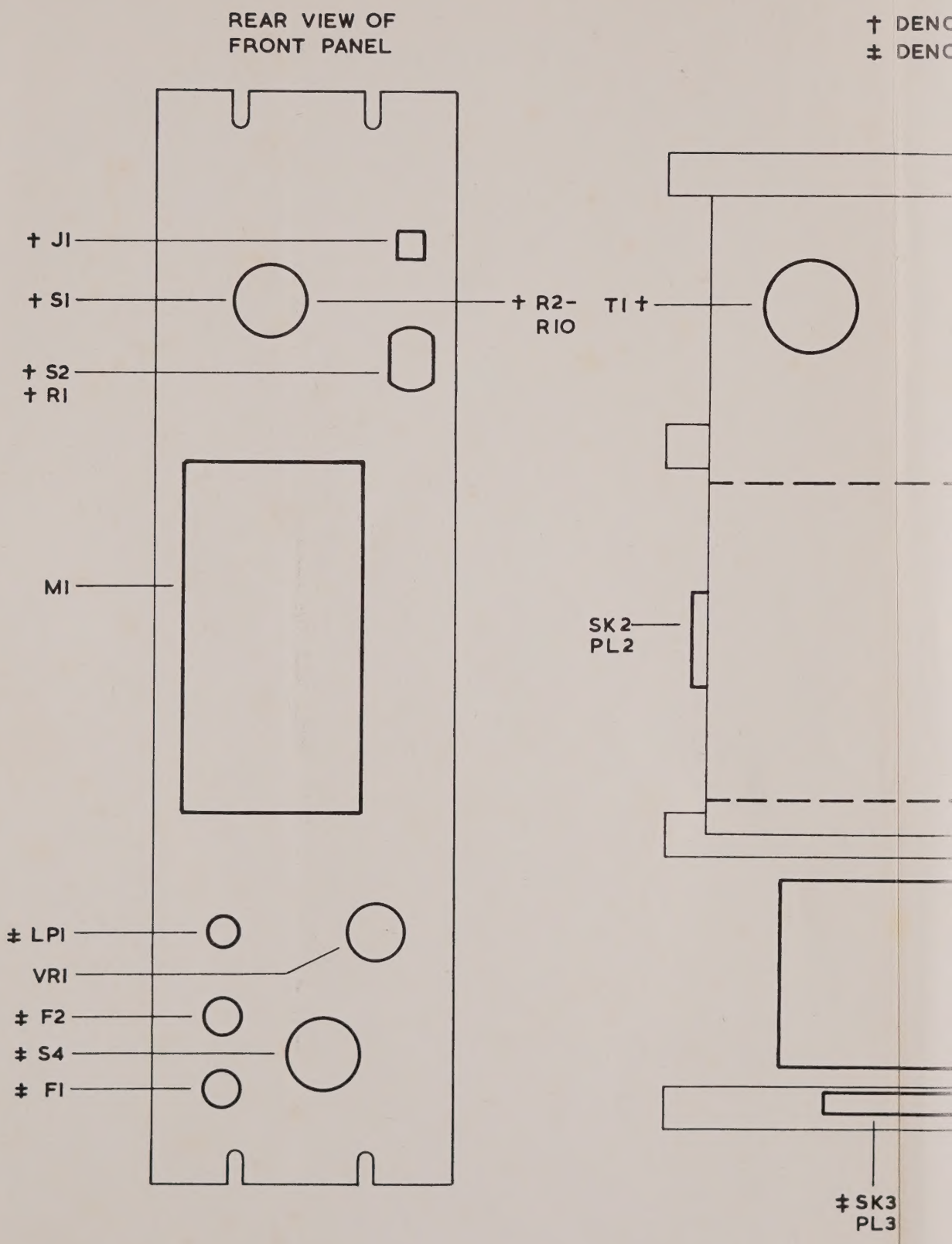
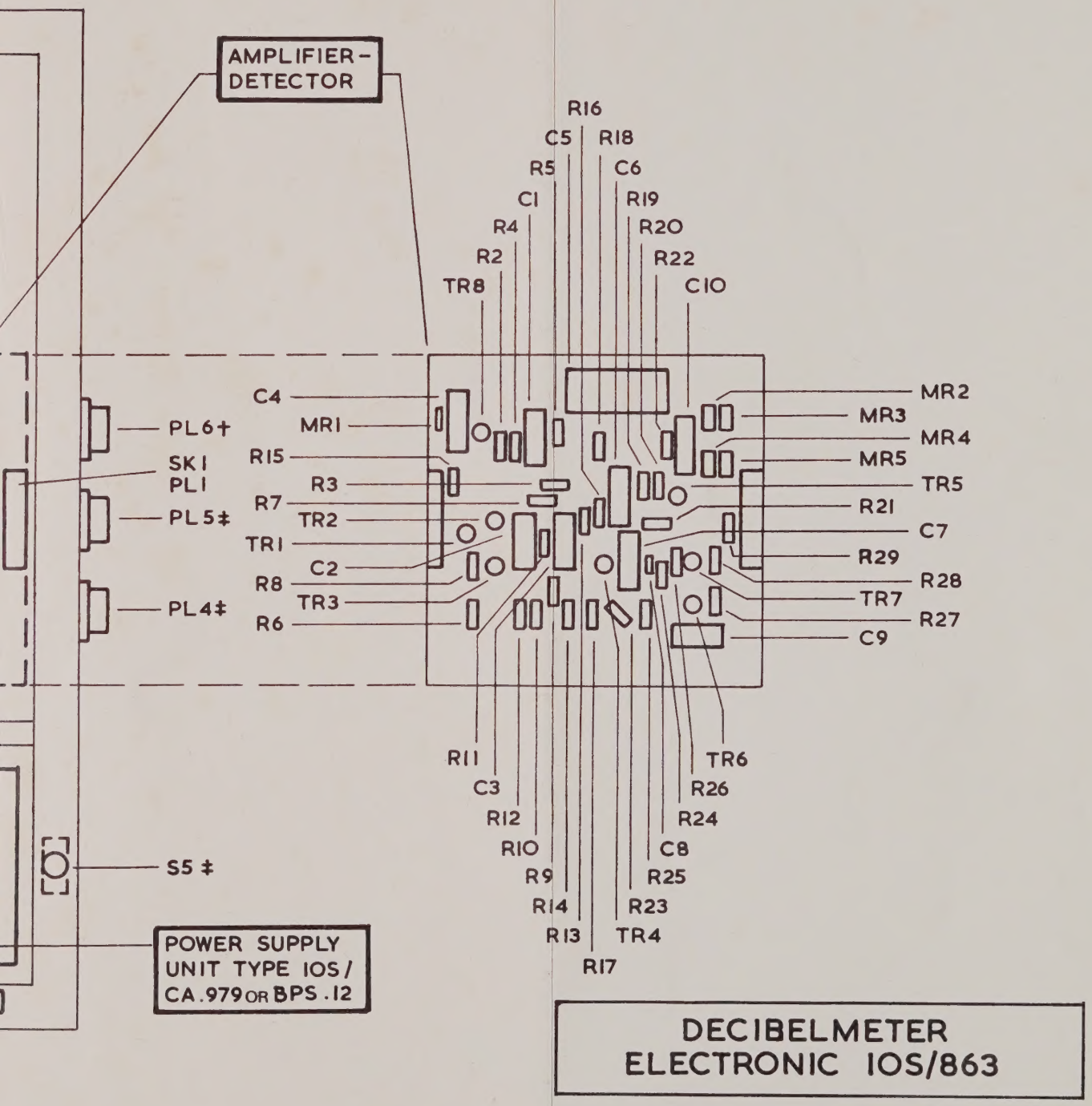

REAR VIEW OF
FRONT PANEL
† DENO
‡ DENO
† J1
† S1
† S2
† R1
† R2-
R10
T1 †
M1
SK2
PL2
‡ LP1
VR1
‡ F2
‡ S4
‡ F1
‡ SK3
PL3

ES COMPONENTS PART OF INPUT STAGE
ES COMPONENTS PART OF SUPPLIES SWITCHING



DECIBELMETER
ELECTRONIC IOS/863

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